Support for Obesity-related Policy and its Association with Motivation for Weight Control

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Abstract

Concern over rising obesity levels in western nations is reflected in recent governmental interest in policy-level initiatives to tackle this. The present study aimed to enhance our understanding of how people respond to policies that are introduced to influence their behaviour by exploring the association between people's support for policy and beliefs surrounding its efficacy and their motivation towards controlling their own weight. The study used the framework of self-determination theory to explore the association between policy- and individual-level effects. Data were collected from 188 UK participants (42% male, 95% white, 50% overweight, and 74% actively trying to control their weight). Measures included beliefs regarding obesity causality and severity, perceived societal pressure to be thin, support for obesity-related policies, motivation for weight loss behaviours, and objectively measured weight. Levels of support were similar for overweight and non-overweight participants. The majority of people (75.5%) actively supported obesity-related polices, and reported significantly greater support for redistributive and compensatory policies (76.6% in both cases) than for price raising policies (43.6%). Policy support was predicted by perceived societal pressure to be thin (R^2=.09). Greater support for obesity-related policies significantly predicted controlled, but not autonomous, motivation towards weight loss behaviours (R^2=0.14). The findings suggest that while obesity-related policy intervention in the UK is largely considered legitimate it does not promote autonomous, and by implication lasting, motivation for individuals to engage in weight control behaviours.

Key words: Obesity Policy, Policy Support, Motivation, Weight Control

Obesity has been identified as a global health epidemic. In 2008 the World Health Organisation estimated 1.4 billion adults worldwide were classed as overweight and 500 million of these obese (WHO, 2008). Westernised nations show the highest obesity rates, for example in the UK over half of adults are classed as overweight and a quarter as obese (National Health Service, 2010) with these figures set to rise. Obesity increases the risk of many non-communicable diseases such as heart disease, stroke and musculoskeletal disorders (Bray, 2004) and increases disability in later life (Mayhew, Richardson, & Rickayzen, 2009). As such, investigating how obesity prevention and management initiative can be more effectively delivered is extremely important (Chan & Woo, 2008).

Many approaches to the prevention and treatment of obesity are targeted at the level of the individual, for example through developing medical (Colquitt, Picot, Loveman and Clegg, 2009) or behaviour change interventions (e.g. Shaw, O'Rourke, Del Mar & Kenardy, 2005). However, while providing support and encouragement for individuals to change their behaviour is no doubt important, the social (e.g. family, peer and cultural influences) and/or built environment (e.g. presence of parks, food outlets, perceived safety) in which people live also significantly impact obesity levels (Papas et al., 2007; McNeill, Kreuter & Subramanian, 2006). As such, it is argued that it is the interaction between an individual and their environment that is fundamental to explaining, and therefore tackling, the rise in obesity levels (Bouchard, 2008; Wardle, 2007; Foresight, 2007). To do this requires intervention at a policy level (Swinburn, 2008).

Successful policy approaches in other health domains (e.g., tobacco control) suggest that a multi-dimensional approach is most effective in changing behaviour, through targeting different determinants of target behaviours and promoting change in different ways (West, 2007; Yach, McKee, Lopez & Novotny, 2005). However, there are inherent differences in

factors driving the behaviours that contribute to obesity (i.e., diet and physical activity) which have an on-going role in a person's life, whatever their weight, compared with discrete health risk behaviours such as smoking and alcohol misuse. More work is required to explore whether and which policy approaches are successfully transferable across health domains and to investigate which the public will find acceptable and will subsequently support. Support from the public has emerged as an important element of policy development by helping to conceptualise issues and encourage policy makers to implement new strategies (Rayens et al., 2007). Furthermore, research in other health domains suggests that public support determines people's reactions to a policy, including their willingness for long-term engagement (Room, Graves, Giesbrecht & Greenfield, 1995; Giesbrecht & Kavanagh, 1999).

There is little consistency in past work investigating what influences obesity policy support. One of the first studies to examine public attitudes towards obesity and obesity policy in the United States, by conducting telephone interviews with 909 adult participants, found that having external health attributions (i.e. believing ones health in general is outside ones control), and believing policy intervention to have been effective for other health behaviours (e.g., smoking, alcohol consumption) predicted higher support for obesity-related policies (Oliver & Lee, 2005). Another leading U.S. study sought to identify factors that shape attitudes towards obesity policies using a large web-sample survey (Barry, Brescoll, Brownell & Schlesinger, 2009). This study found that beliefs about the causes of obesity relate to public support of policy; i.e., support is higher among those who believe obesity is caused by the environment rather than the individual. Further investigation has found that people are also more willing to back a policy if they agree that a topic is important and will be of personal benefit (Carlson et al., 2011), but less likely to support it if it is perceived to negatively influence their desired lifestyle; for example, people who smoke more are less likely to support policies surrounding tobacco control (e.g., Gardner & West, 2010,

Rosenberg, Pettigrew, Wood, Ferguson & Houghton, 2012). Similarly, in the obesity field, overweight and obese individuals generally show lower support for obesity policies than healthy weight individuals (Barry et al, 2009). However, predicting likely support for a policy before it is implemented is problematic as people do not accurately predict how their preferences will change over time (Promberger, 2009) and commonly change their attitudes once the legislation is in place; for example, support for smoke free legislation in Ireland increased from 43% to 83% after its introduction (Fong et al., 2006). As such, conducting research to better understand the link between attitudes, policy support, and likely behavioral responses is very important.

One factor that has a clear relationship to behavioural outcomes and may be useful in understanding this link is a person's motivation. Self-determination theory (SDT; Deci & Ryan, 1985; Deci & Ryan, 1991) provides a framework for exploring how policy level factors can influence motivation through the policy's impact on the social environment (Moller, Ryan & Deci, 2006). SDT centres on how an individual experiences their social environment in terms of the degree to which they feel controlled or supported by it to act in ways that are consistent with their own views and preferences. Autonomous forms of motivation are predicted to result from environments that support choice and a sense of personal agency (e.g. the choice to opt in to a particular health scheme) and controlled forms of motivation from environments that undermine choice and exert pressure to behave in certain ways (e.g. as speeding fines or tax on cigarettes). Research has shown that acting through autonomous motivation is associated with better behavioural persistence, enjoyment, and well-being than when feeling controlled by others or a wider society or culture (Ryan & Deci, 2000).

From an SDT perspective, motivation for health behaviours has typically been studied at the individual or group level. In these cases, autonomy support is associated with better long-term outcomes in doctor-patient relationships (Williams, 2002), in exercise class settings (Edmunds, Ntoumanis & Duda, 2006), and in the receipt of health promotion information and advice (Williams, McGregor, Zeldman, Freedman & Deci, 2004; e.g., Williams & French, 2011). While little intervention research at a policy-level has been conducted explicitly testing/applying SDT, an indication that this framework is applicable can be gained from observational research in the work place; a number of studies have shown that autonomy supportive social climates are related to positive outcomes at an organisational level (e.g., Burstyn et al, 2010; Phillippe & Vallerand, 2008). For example, Burstyn et al (2010) reported on the outcome of autonomy-supportive (i.e., presenting rationales and giving employees choice), versus controlling (i.e., pressurised, authoritarian) approaches to conflict resolution in the management of health and safety inspectors, confirming compliance with health and safety regulations (verified through objective administrative records) was more quickly and collaboratively achieved through a policy supportive of autonomy, than was achieved through more controlling enforcement approaches. In the health care sector, Phillippe and Vallerand (2008) assessed patients' perceptions of autonomy support generated by nurses across 11 nursing homes, and reported that supportive environments (i.e., opportunities to lead decision making regarding care and daily activities) were associated with positive patient adjustment, and autonomous motivation in major life domains.

Extending this one step further, the social environment beyond a person's immediate home or work environment can also exert strong influences on perceptions of control and motivation; as shown, for example, by the pervasiveness of perceived social pressure from the media and wider society to conform to a thin ideal body type and its documented links to day to day behaviour (Wardle, Waller & Fox, 2002; Mask & Blanchard, 2011). It is at this

global, societal level that social policies act. As such, past work from an SDT perspective can contribute to our understanding of how the content of a policy and the way in which it is presented may influence motivation, namely through the degree to which people perceive it to exert control over their behaviour or support their autonomy in making the changes that they would like to make (Moller et al., 2006).

Past work conducted from an SDT perspective shows how outwardly controlling environments can be internalized (i.e., people come to accept environmental controls, feeling autonomous in complying with them) if a meaningful rationale is presented (Reeve, Jang, Hardre and Omura, 2002). For example, although the law requiring people to wear seatbelts is punitive, people can understand and appreciate that it has been imposed to save lives and therefore can feel autonomous in complying with it (they agree with its aims, and therefore chose to change their behaviour in line with the policy). Similarly, it is argued that smoke-free legislation has been widely accepted by smokers due to their acknowledgement of the governments' responsibility to protect the health of non-smokers (Borland et al., 2006). As such, understanding people's views of the legitimacy of policy level intervention aimed at changing dietary and physical activity behaviours may help us to understand their ultimate behavioural response, mediated through the development of autonomous versus controlled motivation. Given that findings from policy implementation in other areas shows that attitudes may change following implementation (Brown, Moodie and Hastings, 2009; Tang et al., 2003), exploring the association between these and motivation could be a useful means of predicting a policy's likely short- and long-term impact.

Little is currently known about public opinion and support for government intervention for obesity and within this for specific obesity policies. One of the few studies available dating from 2005, and conducted in the United States, suggested that at this time

there was little appetite for dramatic policy shifts, with people largely supporting policies that either specifically target children (i.e., posit no direct impact on an adult's own physical activity or dietary habits) or take a relatively benign approach, such as providing information about the health-behaviour link and/or the consequences of continuing with a given behaviour (Oliver and Lee, 2005). Despite being successful in targeting other health behaviours (such as smoking), macro-environmental policies (e.g. taxes on foods) that generally receive low support from the public are rarely introduced (Hilbert et al, 2007; Oliver and Lee, 2005). In 2011, Denmark introduced tax on foods high in saturated fat, however due to a lack of continued public support and health benefit this strategy was recently revoked (Stones, 2012). In light of this, the researchers set out to extend our knowledge and understanding in this area to explore: Objective (i), support for a range of obesity policies in the UK, objective (ii), factors that influence policy support, and objective (iii), how policy support relates to autonomous and controlled motivation towards weight control, in line with the principles of SDT.

Method

Design

The present study adopted a cross-sectional design. Data collection was staggered across two time points (approximately 1 week apart) to minimise potential priming effects of anthropometric measurements on weight-related psychosocial questionnaires.

Participants

Participants were recruited opportunistically through internet and poster advertisements, large employers, and leisure facilities in the south west of England. All adults over the age of 18 who could speak English sufficiently to fully understand the questionnaires used were

eligible to take part. Participants who completed both sets of questionnaires were entered into a prize draw to win £40 shopping vouchers. 188 participants provided complete data (38% male, 95% white). A subsample (N=126) provided weight and height data facilitating the calculation of BMI (*M*= 25.8, Range=18.4-44.5), of whom 50% were classified as overweight or obese.

Measures

Demographics. Demographic variables were assessed using five questions previously used in health surveys such as the Cancer Awareness Measure (University College London, 2008) which recorded age, gender, ethnicity, education, and home ownership status.

Anthropological measures. Height and weight were measured using the SECA Leicester Portable Height Measure and the SECA electronic weighing scale (model 884). Body Mass Index (BMI) was subsequently calculated as weight (kg)/ height^2 (m). Participants were classed as overweight (BMI ≥25), or non-overweight (BMI< 25) in line with standard medical criteria (WHO, 2011).

Causes of obesity. Participants' beliefs regarding the causes of obesity were measured using an eight-item scale grouped into three subscales: the environment (four items, e.g. "there is too much unhealthy and fatty food in restaurants and supermarkets"), biological factors (two items, e.g. "being overweight is something you inherit from your parents") and personal attributes (two items, e.g. "most people lack the willpower to diet or exercise regularly") (Oliver & Lee, 2005; Hilbert, Rief & Brahler, 2007). Scores were recorded on a five point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*), and averaged to calculate subscale scores. These subscales were found to be only moderately reliable, Environmental (α= 0.37), Biological (α=0.34), Personal Attribute (α=0.33).

Perceived severity of obesity. Participants responded to two statements regarding beliefs of the significance of the obesity epidemic, adapted for use in the United Kingdom (i.e. 'Germany' replaced with 'UK'; Hilbert et al, 2007). These statements were 'Obesity is one of the major health problems in the United Kingdom' and 'Obesity increases the risk for diseases such as diabetes and cancer'. Scores were recorded on a five point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Support for obesity policies. Participants are presented with descriptions of proposed obesity policies identified as having the largest potential impact on public health and which were politically feasible (Barry et al, 2009; Brescoll, Kersh & Brownell, 2008). The items were taken from a measure by Barry et al (2009), previously used in America, and asked to rate their level of support for each on a seven point Likert scale, from 1 (*disagree strongly*) to 7 (*agree strongly*). Adaptions were made to make it applicable to the UK, thus items referring to laws that are not present in the UK were excluded and two items substituted that referred to the UK's national health service, and national insurance payments. The authors of the original scale identified three subscales through factor analysis, representing redistributive, compensatory, and price raising government strategies. Redistributive policies were defined as those that would require a general tax increase for the country (e.g. paid time each day for workers to exercise), compensatory policies defined as those that aimed at helping or protecting citizens (e.g. food warning labels for high fat/sugar content), and price-raising policies as those with putative aims to punish individuals engaging in the behaviours directly associated with obesity (e.g. tax on junk food). An average score for each subscale was calculated. No previous reliability statistics for these subscales were found, but in the present study reliability was as follows: redistributive (7 items, α=0.71), compensatory (6 items, α=0.52) and price-raising (4 items, α=0.77).

Perceived weight discrepancy. A perceived weight discrepancy score was derived using the Contour Drawing Rating Scale (Thompson & Gray, 1995). Same-sex sketches were presented to participants, labelled from 1 to 9 with increasing size. Participants were asked to indicate which sketch is most like their body, and which is the healthiest. The number for the healthiest body was subtracted from the number for the body most like the participants to give a single numerical discrepancy score. A positive score denoted a person perceiving their own body as larger than the healthiest body, a score of zero denoted a person perceiving themselves as the same, and a negative score denoted a person perceiving themselves as having a smaller body. The scale has previously been used in a number of populations and has high test-retest reliability and validity (>0.7) (Wertheim, Paxton & Tilgner, 2004; Furnham, Badmin & Sneade, 2002; Boroughs & Thompson, 2002).

Perceived pressure scale. The Perceived Socio-Cultural Pressure Scale (McCabe & Ricciardelli, 2001) assessed participants' perceived pressure from the social environment to lose weight and be thin. This six-item scale consists of statements asking participants to indicate how often they feel pressure from families, friends, and the media on a five point Likert scale from 1 (*never*) to 5 (*always*) (e.g. " I've felt pressure from my family to lose weight"). A single score of perceived social pressure was calculated for analysis by averaging the individual scores. The scale has been shown to have a high level of internal reliability ($\alpha > 0.7$) in previous research (Blowers, Loxton, Grady-Flesser, Occhipinti & Dawe, 2003) and in the current sample ($\alpha = 0.78$).

Motivation. The Treatment Self-Regulation Questionnaire (TSRQ; Ryan and Connell, 1989) was used to assess motivation for weight management. The scale consists of 12 statements preceded with 'When I take steps to control my weight it is…', and participants were required to indicate how true to them each statement is for them on a 7 point Likert scale from 1 (*not at all true*) to 7 (*very true*). Six of the statements refer to autonomous

motivation (e.g., "because it is an important choice I really want to make") and six to controlled motivation (e.g., "because I feel pressure from others to be a healthy weight") and one score for each subscale was calculated from the average of individual responses. This questionnaire has previously been used in health behaviour change research, with the autonomous and controlled subscales being shown to have adequate internal reliability (Cronbach's α ranging from.58 to .93) (Williams, Grow, Freedman, Ryan & Deci, 1996; Levesque et al., 2007). This internal reliability was also found in the present sample (Autonomous motivation α=0.70, Controlled motivation α =0.71).

Procedure

Data collection took place during the summer of 2011 through community settings (e.g. village halls, shopping centres and leisure centres). Participants were provided with an information sheet detailing the purpose of the research and written consent was obtained. Participants then completed two questionnaires, a minimum of one week apart. At Time 1, demographic variables, beliefs regarding the causes of obesity, perceived severity of obesity, body perception, perceived pressure to be thin, and height and weight were measured. At Time 2, questionnaires assessed motivation towards weight control and support for obesity policies. The study received institutional ethical approval and data were treated confidentially and stored according to the data protection act.

Results

Participants

Full descriptive statistics for the sample are shown in Table 1. Of the total sample of 188, 42% were male (N=80) and 95% were white (N=179). Participants providing weight measurements were typically older (t= -1.98, *p*=.05), and significantly less likely to believe in environmental (t= 2.08 *p*=.04) or genetic causes of obesity (t= 2.40, *p*=.02) than those who did not. 50% of these respondents were overweight (N=63) and 74% of the final sample

(N=140) were actively trying to control their weight (taking action to lose/gain or maintain weight). All analyses were conducted using PASW 18.

Table 1

Objective (i): Support for Obesity Policies

A one-way repeated measures ANOVA was conducted to compare levels of public support for the different policy types. Overall, support for obesity-related policy was high, with an average of 75.5% of participants indicating that they agreed with policy-level intervention (i.e., reported mean scores >4, which represents a neutral response; Table 2). Support for individual examples of policy ranged from 23% to 87%. Support was significantly greater for redistributive and compensatory policies (M = 4.79, SD =1.08; M = 4.83, SD = 0.96), than for price-raising policies (M = 3.81, SD = 1.61; F= (1, 187)= 55.65, p<.001).

Commented [a1]: Why is it repeated?

Commented [LE2]: I was a bit confused about this when writing it as well, but I think it must be repeated measures, but cause all participants completed all measures i.e. the comparisons of different policy support was within subjects rather than between? Perhaps saying 'A one-way within subjects ANOVA' is more accurate?'

T-tests were conducted to compare mean levels of support for policy types for overweight and not overweight participants. There was no significant difference in overall levels of policy support according to a person's weight status (i.e., overweight vs non-overweight). However, there were significant differences for three individual items (each from different policy groups): 'Tax credits for gym memberships' had higher support from non-overweight participants than overweight participants (t = 3.22, p<.05), whereas 'tax on junk food' (t = -2.52, p<.05) and 'ban high fat/sugar food advertising on children's television' (t = -1.92, p=.06) had greater support from overweight than non-overweight respondents.

Table 2

Objective (ii): Factors that influence Policy Support

The relative strength of potential predictors of policy support was assessed through a hierarchical regression analysis, controlling for demographic and personal characteristic variables. The dependent variable, *Support for policy*, was a composite measure computed from combining scores on the three subscales. This was justified as support for the three policy types correlated significantly with general policy support and with each other (Table 3), indicating that rather than discriminating between particular policies, people typically report high/low support for most policy types and for policy in general. Correlations between all the policy variables were strong, except for those between redistributive and compensatory, and redistributive and price raising policies which were still of a moderate and meaningful level.

Table 3

In order to develop a parsimonious regression model, only variables demonstrating a significant association with policy support in preliminary correlational analyses were included in the analysis. Following examination of the correlation matrix, five variables were entered into the regression model. Demographic variables (age and BMI) were entered into the first regression block, and psychosocial variables were entered into the second block (belief in the environmental causes of obesity, perceived pressure to be thin, and the belief that obesity is a major health problem).

The initial model consisting of the demographic variables regressed against overall policy support was not significant (R^2= .01; F (2, 125) = .43, p =.65) (Table 4). The second model which included the psychosocial variables was significant and explained 9% variance in policy support (R^2= .09; F (5, 125) = 2.39, p <.05). Within this model perceived pressure to be thin was a significant predictor of policy support (β =.21).

Table 4

Objective (iii): How policy support relates to motivation towards weight control

The degree to which policy support predicted motivation towards weight loss behaviours was analysed through linear regression analysis. Psychosocial variables that were theoretically predicted to influence motivation were considered for inclusion in the model, to allow for assessment of whether policy support added meaningful explanatory power to the model. However, in order to fit a more parsimonious model, only those variables that demonstrated a significant correlation with motivation were entered in the final model (see Table 3). This resulted in the inclusion of three additional variables: perceived pressure to be thin, the degree to which obesity is considered a major health problem, and perception of the severity of the risk of obesity. Perceived pressure to be thin has previously been shown to be associated with perceptions of controlled environments (Gillison, Standage & Skevington, 2006). The perceived severity of obesity, and its importance as a major health problem were included as they relate to the degree to which a person has internalised (i.e., accepted) the reasons why policies endorse behaviour change (i.e., acknowledged a rationale for change; Deci, Eghrari, Patrick & Leone, 1994). The effects of policy support on autonomous and controlled motivation were considered in separate analyses, as there would be different implications to findings of effects on each type of motivation (Standage & Ryan, 2012).

The regression model was not significantly predictive of autonomous motivation (R^2= 0.03) but was significantly predictive of controlled motivation (R^2= 0.14) (Table 5). Controlled motivation was significantly negatively predicted by redistributive policy support (β=-.18) and significantly positively predicted by compensatory policy support (β=.32), price-raising policy support (β=.12), and perceived pressure to be thin (β=.21). The inclusion of the additional psychosocial variables resulted in an increase in the proportion of variance explained by the model from 1.4% to 3% for autonomous motivation (R^2= 0.01 vs R^2= 0.03) and from 11.7% to 13.7% for controlled motivation (R^2=0.12 vs R^2=0.14).

Table 5

Discussion

The present study sought to explore current levels of support for obesity policies in the UK, the factors that influence it, and how it relates to people's motivation to control their weight.

Support for Obesity Policies

The results showed considerable variation in support for individual obesity policies across the seventeen proposed policies. When grouped into three types of policies according to theoretical principles, redistributive, compensatory, and price-raising (as in previous papers, e.g., Barry et al, 2009), support was higher for compensatory and redistributive policies and lower for price raising policies. This difference is consistent with previous research in obesity and smoking domains where it was shown that support for policies requiring price-raising elements had significantly less general public support than those that involve child protection, personal assistance, compensatory or redistributive based strategies (Barry et al, 2009; ASH, 2008).

A possible explanation for this trend is the amount of personal impact that each will have on a person's financial situation or lifestyle, or the amount of effort that would be required to engage with it. For example, many of the redistributive policies that have a high level of support involve educational interventions, mostly addressing children. As such there are no financial, behavioural or other direct consequences on adults themselves, so there would be few implications of supporting them. Similarly, both compensatory and redistributive policies target the environment in ways that require minimal active

engagement; redistributive polices focus on providing healthy opportunities that people are not obliged to take up (e.g., network of treatment programmes, or paid time available for exercise within the workplace) and compensatory policies impose restriction of unhealthy environments that would similarly not impinge on a person's habits or time (e.g., banning advertising, requiring restaurants to prepare healthier foods). Conversely, price-raising policies have a more direct and punitive impact on the individual, e.g., requiring them to pay more tax. Within the present sample, support for redistributive and compensatory policies was positively associated with beliefs in the national importance of obesity, but this association was not found for price-raising policies (i.e., those with more perceptible financial impacts). That is, the visibility of anticipated sacrifice appeared to moderate the relationship between the perception of the issue's importance and policy support.

Factors that Influence Policy Support

Previous international research has highlighted numerous factors that influence policy support, such as beliefs in the causes of obesity, its perceived importance, assessments of personal costs and benefits, and a person's level of support for policy intervention in general (Barry et al, 2009, Carlson et al., 2011, Oliver & Lee, 2005). One of the aims of the present study was therefore to assess whether these factors also proved important in our UK sample, and to clarify which of these may be the most influential in predicting policy support. In addition, we included variables that research in other health domains reports to influence levels of support, but are absent from existing work in the obesity policy domain. One such factor, extrapolated from findings that heavier smokers are less likely to support tobacco control policies (e.g., Gardner & West, 2010, Rosenberg et al., 2012), was the prediction that there would be lesser support for obesity-related policies from overweight than from non-overweight people. However, although there were differences of small effect size in three isolated policies (notably with different directions of effect), there was no overall difference

in the level of support for any of the three different types of policy support according to weight status in our sample.

One reason for this lack of effect may be the difference between behaviours that policy tries to influence. Smoking is a discrete behaviour that non-smokers do not engage in, so any restrictions and penalties for smoking will have little or no direct negative effect on them. However, the targets of obesity policy, diet and exercise, are factors that affect all people; indeed there are many healthy weight people who are sedentary and/or who eat a poor diet and may be equally affected by policy change. An alternative or further explanation may lie in levels of awareness; many people who are overweight do not recognise themselves as such (Kuchler & Variyam, 2003), or believe they are overweight due to reasons beyond their control (i.e., medical or genetic factors; Wang & Coups, 2010). As such, they may not perceive policies to be directed towards them in the way that smokers would. Further work would be valuable to explore whether factors such as lack of awareness may be in some respects advantageous (e.g., by reducing defensiveness) or problematic as people may not perceived displayed messages as relevant to them (Wammes, Breedveld, Looman & Brug, 2007). Understanding the factors behind the lack of difference in responses between overweight and non-overweight people thus may be important to tailoring the content and delivery of health promoting policies.

Greater support for obesity policies across participants of all weight categories was associated with greater perceived pressure from friends, family, and the media to be thin. This finding supports previous theoretical research suggesting that attitudes are shaped by knowledge and personal interest in the subject; i.e., people who were aware that obesity is a health threat and feel pressure from society to lose weight were more likely to support policies that may help them to achieve this (Oliver & Lee, 2005). The finding of a significant relationship between perceived pressure and policy support has not been previously reported

and may provide a new insight to direct future research. For example, people who feel that it is society that is pushing them to act in certain ways may feel that the same society therefore *ought* to help them to achieve these aims, and thereby consider changes to the environment to support this as justified. Further qualitative work would be informative to explore whether this, or alternative explanations underpin this relationship.

How policy support relates to motivation towards weight control

Support for obesity policies significantly predicted controlled motivation, but not autonomous motivation. The lack of association with autonomous motivation was initially unexpected given that according to the tenets of SDT, the acceptance of the rationale for change is associated with more autonomous functioning (Ryan & Deci, 2000), and the understanding of such a rationale (i.e., belief that obesity is an important public health issue) was found to positively predict policy support in the present study. However, the association between policy support and controlled motivation may be indicative that even when people support policy as a result of recognising the importance of national initiatives to prevent obesity, and/or the difficulty of losing weight on one's own, they still experience it as controlling when applying it to their own behaviour. The findings for controlled motivation are difficult to interpret as controlled motivation was positively predicted by support for two policy types (compensatory and price-raising) but negatively predicted by redistributive policy support. A key difference between redistributive policies and other variants is the degree to which people have a choice whether or not to engage with them; people can opt out of redistributive policies (e.g., tax credits for gym membership, paid time for daily exercise at work) whereas the remaining types are imposed on them (Oliver & Lee, 2005). This interpretation is consistent with the directions of effect on controlled motivation. It is interesting that people may support a policy and yet still feel controlled by it, as is indicated for compensatory and price-raising policy types. On a psychological level this may reflect

people's lack of belief in their ability to control their weight through their own individual actions, so supporting policies that change the social or financial environment may reflect help-seeking behaviour in the form of requesting additional external controls to be imposed. Past work in the SDT domain documents how people often initially ask for constraints to be imposed on them to help them to change their behaviour, but that the provision of these external controls does not lead to successfully sustained behaviour change (Standage & Ryan, 2012).

Limitations

While the present study provides some novel findings and suggests new directions for conceptualising obesity-related policy research, there are a number of limitations to our conclusions. First, the study was cross-sectional, and so causal relationships between the policy environment and motivation cannot be inferred. Second, the policy examples provided to participants related to changing either dietary or physical activity environments but we measured motivation towards weight control. This was in order to simplify the study, as it was considered from pilot work that participants would be less likely to complete the survey instruments if all measures were repeated for diet and exercise separately. However, we may not have captured the relationship between policy support and motivation for health behaviours that was independent of a weight loss or maintenance goal. A further limitation is the limited reliability of some of the scales that were used. The causal beliefs about obesity subscales had particularly low scale reliability, potentially due to the amendments that were made to the original Oliver and Lee (2005) scale in order to effectively account for environmental causes. The results which involve these must therefore be treated with caution. Finally, our sample was not sufficiently large to allow us to conduct more advanced statistical analyses (i.e., structural equation modelling) incorporating all variables in a single model.

Conclusions and Implications for Policy Makers

The present study provides a contemporary snapshot of the level of support for obesity-related policy in the UK, and novel insights into associations between support for policy, beliefs around obesity, and an individual's motivation for taking steps to control their own weight. It is one of the first studies to look at individual responses to the social environment on the policy level and is the first study to look at the policy environment in the obesity context in the UK. Furthermore, through including the objective assessment of BMI, we extended past work to enable us to explore the impact of a person's own weight on their views relating to the introduction of obesity-related policies.

While support for policies is known to change following their implementation (Fong et al., 2006), initial public support is still important in predicting the success of policies as a result of their acceptance, and also to the commitment of policy makers to their implementation (Oliver & Lee, 2005; Wellever, Reichard & Velasco, 2004). Understanding the determinants of policy support is therefore important for identifying factors that underpin public attitudes towards policies, providing information to policy makers regarding factors they could target to enhance the chance of engagement and acceptance of planned policy changes. One key finding of the current study in this respect was that the public already appreciate that obesity is a significant health issue and that it poses a significant national public health challenge, so further educational initiatives to this effect may have limited additional impact. However, despite relatively widespread support for obesity-related policy, this support is associated with controlled motivation suggesting that people have yet to fully accept the personal benefits of maintaining a healthy weight, and still feel they are at least partially acting for extrinsic motives (i.e., to please /adhere to the priorities of others).

Theory suggests that behaviour changes prompted by controlled motivation would be short-lived. As such, future initiatives may need to focus on communicating more personally relevant reasons for engaging in healthy lifestyle behaviours, helping people to feel they are acting less out of duty to others (e.g., from the perceived societal pressures to be thin, and reduce obesity related costs to the NHS), and more for their own benefit (e.g., to feel better, or prolong their own lives). Further qualitative work to explore what messages may resonate best with different groups of the population would be valuable.

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Table 1

Descriptive Statistics of all Measured Variables and Subscales

	M	*S.D*	*Min*	*Max*	*95% CI*
Age	44.35	16.72	18	80	41.94, 46.75
BMI*	25.89	4.68	18.4	44.5	25.06, 26.71
Waist**	87.51	11.5	62	120.3	85.02, 89.99
Causal Beliefs (scale: 1 to 5)					
Environmental cause	3.33	0.59	1.5	4.5	3.25, 3.42
Biological cause	2.12	0.62	1	4	2.03, 2.21
Personal attribute	3.40	0.79	1.5	5	3.29, 3.51
Perceived pressure to be thin (scale 1 to 5)	2.10	0.75	0.98	4.17	1.99, 2.20
Perceived weight discrepancy***	1.23	1.47	-2	6	1.02, 1.45
Perceived severity of obesity (scale: 1 to 5)					
Obesity is a major health problem	4.29	0.724	1	5	4.18, 4.39
Obesity increases the risk of many diseases	4.59	0.542	3	5	4.51, 4.67
Motivation towards weight loss/control (scale: 1 to 7)					
Autonomous Motivation	5.74	0.84	2.83	7	4.26, 4.57
Controlled motivation	4.41	1.08	1.5	6.67	5.62, 5.86

Notes: * obtained for subsample (n=126); ** obtained for a subsample (n=85); *** a positive score indicates a larger, and a negative score indicates a smaller perceived body size than that considered healthy

Table 2

Support for Type of Obesity Prevention Policy, by Weight Status

					Overweight	Non Overweight
	M	*S.D.*	*95% CI*	*% Active support*	*M (N=63)*	*M (N=63)*
Redistributive policies (α=0.71) (scale: 1 to 7)	4.78	1.08	4.63, 4.94	76.6	4.82	4.88
Fund schools to make fruit and veg available	5.68	1.74		82.9	5.72	5.52
Eliminate fast-food and soft drinks from schools	6.03	1.28		86.1	6.28	5.87
Tax credits for gym memberships	4.60	1.84		55.2	4.10**	5.13**
National summer camps emphasising nutrition and exercise	5.02	1.87		74.5	5.14	5.12
Education programme warning against yo-yo dieting	4.44	1.79		49.9	4.50	4.46
Network of obesity treatment programmes	4.23	1.89		50.0	4.23	4.35
Paid time each day for workers to exercise	3.49	2.01		33.0	3.76	3.61
Compensatory policies (α=0.52) (scale: 1 to 7)	4.82	0.96	4.69, 4.96	76.6	5.00	4.78
The NHS should provide help for overweight people	4.67	1.88		57.9	4.40	4.73
Food labels warning of high sugar/fat content	6.04	1.23		87.2	6.24	6.10
Television to make public announcements on healthy eating and exercise	5.11	1.72		65.3	5.36	5.19
Ban high fat/sugar food advertising on children's television	5.59	1.59		74.0	5.92*	5.38*

Restaurants to prepare food in healthiest way	4.48	2.04		51.9	4.89	4.49
Give overweight people disability protection and benefits	3.07	2.06		26.1	3.20	2.78
Price raising policies (α=0.77) (scale: 1 to 7)	3.81	1.61	3.58, 4.04	43.6	4.09	3.8
Higher prices for high sugar/fat content foods and lower prices for fresh fruit and vegetables	4.23	2.16		47.9	4.37	4.33
Junk food tax	4.18	2.23		49.5	4.87*	3.91*
Higher health insurance premiums for overweight people	3.81	2.07		36.1	3.98	3.95
Higher national insurance for overweight individuals	3.03	1.91		23.3	3.15	3.03
Total policy support	4.57	0.97	4.45, 4.70	75.5%	4.71	4.59

Notes: ** $p < 0.01$, * $p < 0.1$. On all scales, a value of 4 represents a neutral response.

Table 3

Correlations between Study Variables

	Mean	*SD*	*2*	*3*	*4*	*5±*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
1. Policy support	4.57	.87	.84**	.69**	.68**	.07	.10	-.05	.05	.19*	.08	.14*	.05	-.02	.19**	.11
2.Redistributive Policies	4.78	1.07		.44**	.35**	.02	.01	-.08	.10	.11	.08	.06	.01	-.08	.02	.07
3.Compensatory Policies	4.82	.96			.17*	.18*	.16*	-.03	.06	.24**	.12	.22**	.11	.06	.28**	.10
4.Price raising Policies	3.81	1.61				-.00	.08	.00	.05	.09	-.03	.07	.02	.00	.17*	.09
5. BMI±	25.89	4.68					.05	.11	.02	.26**	.65**	-.11	-.04	-.20*	.05	-.12
6.Environmental causes	3.33	.59						.09	-.01	.18*	.05	.16*	.23*	.18*	.01	.03
7.Biological causes	2.12	.62							-.05	.03	.09	-.04	-.12	-.06	-.02	.05
8. Personal attribute	3.40	.79								.02	.01	-.08	-.02	.0	.01	.03
9. Perceived pressure	2.10	.75									.42**	-.03	.07	-.01	.21**	-.03
10. Perceived weight status	1.23	1.47										-.11	-.07	.20**	.11	-.05

11. Obesity is a major health problem	4.29	.72		.53**	.01	.08	.13
12. Obesity increases the risk of diseases	4.59	.72			.01	.05	.11
13. Age	44.35	16.72				-.13	-.12
14. Controlled Motivation	4.41	1.08					.46**
15. Autonomous Motivation	5.74	.84					

Notes: *$p < 0.05$ (2-tailed), ** $p<0.01$ (2-tailed), ± BMI available for a subsample of 126 participants

Table 4

Regression predicting Policy Support

	B	*SE B*	*β*
Model 1	4.31	.46	
Age	-.00	.01	-.03
BMI	.02	.02	.08
Model 2	2.82	.75	
Age	-.00	.01	-0.2
BMI	.01	.01	.04
Obesity is a major UK health problem	.18	.11	.14
Perceived Pressure to be thin	.25	.11	.21*
Environmental Causal beliefs	.12	.13	.08

Notes: *$p < 0.05$ (2-tailed)

Table 5

Regression predicting Autonomous and Controlled Motivation

	B	*SE B*	*β*
Autonomous Motivation			
Model	4.53	.61	
Perceived Pressure to be thin	-.05	.08	-.05
Obesity is a major UK health problem	.09	.10	.08
Obesity increases the risk for diseases	.11	.13	.07
Redistributive Policies	.01	.07	.01
Compensatory Policies	.06	.07	.07
Price-raising policies	.04	.04	.07
Controlled Motivation			
Model	2.72	.75	
Perceived Pressure to be thin	.12	.10	.15*
Obesity is a major UK health problem	.04	.13	.03
Obesity increases the risk for diseases	-.01	.16	-.00
Redistributive Policies	-.18	.08	-.18*
Compensatory Policies	.32	.09	.29**
Price-raising policies	.12	.05	.17*

Notes: *$p < 0.05$ (2-tailed), ** $p < 0.001$ (2-tailed)